

REMARKS

This responds to the Final Office Action mailed on November 4, 2008.

Claims 19, 27, and 28 are amended. Claims 1-19, 21-25, and 27-29 remain pending in this application.

§103 Rejection of the Claims

Claims 19, 22-24 and 27-29 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Banquy (U.S. 4,782,096, hereinafter “Banquy”) in view of Davis et al. (“Cryogenics for Syngas Processing”, *Chemical Engineering Progress*, February 1980, pages 72-79, hereinafter “Davis”) and McNeil et al. (U.S. 6,073,461, hereinafter “McNeil”).

Claim 21 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Banquy in view of Davis and McNeil as applied to claim 19, and further in view of Ireland et al. (U.S. 4,044,063, hereinafter “Ireland”).

Claim 25 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Banquy in view of Davis and McNeil as applied to claim 19, and further in view of Keller (4,650,814, hereinafter “Keller”).

Claim 19

Claim 19 has been amended to better describe the recited subject matter. Support for the amendment is found, for example, in the last paragraph starting on page 1 (“Syngas can also ...”) and the third paragraph on page 18 (“In order to ...”) of the present application.

Applicant respectfully traverses the rejection and submits that Banquy, Davis and McNeil, individually or in combination with each other and reasoning given in the Office Action, do not provide the claimed subject matter. For example, Applicant is unable to find in Banquy, Davis and McNeil, individually or in combination, among other things, a syngas generation system configured to generate syngas comprising carbon monoxide and hydrogen by endothermic reaction of the gas comprising methane with steam and an oxidant gas comprising oxygen, wherein heat for endothermic syngas generation is produced by exothermic reaction of

the gas comprising methane with the oxidant gas, as recited in claim 19. Applicant is also unable to find in the Office Action a reason that addresses this deficiency of the cited references.

The Office Action asserts, in paragraph 2, that “Banquy discloses ... a syngas generation system (i.e., comprising a “primary steam reforming” zone and a “secondary oxygen reforming” zone; in detail in FIG. 2) generating syngas 11 by reaction of methane 2 with steam 5 and/or an oxidant comprising oxygen 8, (see, for example, column 6, line 19 to column 9, line 3)”. The cited portions of Banquy relate to an “endothermic primary steam reforming reaction” for which the required heat “is supplied by the burners of primary reforming heater F” (column 6, lines 42-49). Applicant is unable to find in Banquy that the “primary steam reforming” uses heat produced in the “secondary oxygen reforming”. At least for this reason, it is believed that the combination of the references as set forth in the Office Action does not result in the subject matter recited in claim 19.

Additionally, the Office Action asserts that “Banquy discloses that ‘[a]ny physical separation process can be used’ in the physical separation zone” and cites Davis and McNeil to provide the separated carbon monoxide product recited in claim 19. However, the cited portions of Banquy appear to relate to separation of only hydrogen from its purge gas. For example, Banquy states that the purge gas “is subjected to a physical separation to split it into a hydrogen-rich stream, a portion of which will be mixed with raw synthesis gas to form the final synthesis gas and a residual gas stream which contains essentially methane, carbon oxides, argon, nitrogen and some hydrogen, and which can be used as fuel in the primary stream [sic] reformer” (column 9, lines 47-54), and that “essentially all the carbon monoxide in the purge gas reacts with steam, in the presence of a shift conversion catalyst, to form carbon dioxide and hydrogen” (column 10, lines 4-7). Thus, it is believed that the cited statement of Banquy that “[a]ny physical separation process can be used” refers to only separation of hydrogen, and by providing that “essentially all the carbon monoxide in the purge gas reacts with steam”, Banquy in fact teaches away from producing the separated carbon monoxide product as recited in claim 19. Therefore, Applicant respectfully submits that the Office Action does not provide clearly articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.

Applicant respectfully requests reconsideration and allowance of claim 19.

Claims 22-24 and 27-29

Claims 27 and 28 have been amended to correct typographical errors. Claim 28 has been amended to better describe the recited subject matter. Support for the amendment is found, for example, in the last paragraph starting on page 1 (“Syngas can also ...”).

Applicant respectfully traverses the rejections. Claims 22-24 and 27-29 are dependent on claim 19, which is believed to be allowable for at least the reasons set forth above. Therefore, the discussion above for claim 19 is incorporated herein to support the patentability of claims 22-24 and 27-29.

Additionally, regarding claim 22, the Office Action cites column 9, lines 47-54 of Banquy to support the rejection. However, this cited portion of Banquy appears to relate to feeding “a residual gas stream which contains essentially methane, carbon oxides, argon, nitrogen and some hydrogen” to a syngas generation system, in contrast to feeding separated-carbon monoxide product to a syngas conversion system as recited in claim 22.

Regarding claim 24, the Office Action asserts that “it would have been obvious ... to provide a conduit means for feeding separated methane product from the physical separation zone to the syngas conversion system in the modified apparatus of Banquy”. However, claim 24 recites conduit means for feeding substantially pure liquid methane to the “syngas generation system” rather than the “syngas conversion system”.

Regarding claim 28, Applicant is unable to find in Banquy, Davis and McNeil, individually or in combination, a POX reactor or an ATR in which the gas comprising methane reacts with the oxidant gas comprising oxygen and an EHTR in which the gas comprising methane reacts with the steam.

Applicant respectfully requests reconsideration and allowance of claims 22-24 and 27-29.

Claim 21

Applicant respectfully traverses the rejections. Claim 21 is dependent on claim 19, which is believed to be allowable for at least the reasons set forth above. The addition of Ireland does not appear to address the deficiency of Banquy, Davis and McNeil as discussed above for claim

19. Therefore, the discussion above for claim 19 is incorporated herein to support the patentability of claim 21.

Applicant respectfully requests reconsideration and allowance of claim 21.

Claim 25

Applicant respectfully traverses the rejections. Claim 25 is dependent on claim 19, which is believed to be allowable for at least the reasons set forth above. The addition of Keller does not appear to address the deficiency of Banquy, Davis and McNeil as discussed above for claim 19. Therefore, the discussion above for claim 19 is incorporated herein to support the patentability of claim 25.

Applicant respectfully requests reconsideration and allowance of claim 25.

CONCLUSION

Applicant respectfully submits that the claims are in condition for allowance, and notification to that effect is earnestly requested. The Examiner is invited to telephone Applicant's representative at (612) 373-6965 to facilitate prosecution of this application.

If necessary, please charge any additional fees or credit overpayment to Deposit Account No. 19-0743.

Respectfully submitted,

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By 

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CERTIFICATE UNDER 37 CFR 1.8: The undersigned hereby certifies that this correspondence is being filed using the USPTO's electronic filing system EFS-Web, and is addressed to: Mail Stop RCE, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on January 6th, 2009.

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Signature